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SUPPLEMENTAL TECHNICAL INSTRUCTIONS

Supplement Number	Date Issued
93-4-D	08/24/93

National Mapping Division

SUBJECT

Horizontal Datum Use and Reference on National Mapping Division (NMD) Map and Digital Products

BACKGROUND

A plan for conversion to the North American Datum of 1983 (NAD 83) on National Mapping Division products was initiated in 1989. During the years between the initial and final computations of the NAD 83, the USGS showed predicted NAD 83 corner information on maps cast on the North American Datum of 1927 (NAD 27). With the readjustment of the U.S. geodetic control network by the National Geodetic Survey (NGS), the USGS has begun to cast selected new maps on NAD 83 and to reference the actual NAD 27 - NAD 83 shift on its products. Supplemental Topographic Instruction (STI) 89-2-C, issued September 5, 1989 and STI 92-1-C, issued January 22, 1992 outlined a systematic plan for implementation of NAD 83 on NMD graphic products. These instructions recognized the significant cartographic effort necessary to convert NAD 27 graphic products to NAD 83 and stated that all replacement mapping and standard update mapping of 12 or more contiguous quadrangles would be produced on NAD 83, and would indicate the NAD 27 corners. They identified map products to be cast on NAD 83, and those to be cast on NAD 27. The STIs also provided guidelines on how to show corner ticks for, or otherwise reference, the other datum. Limited update and standard update revision mapping not meeting the qualifying criteria would remain on NAD 27. Orthophoto quadrangles were to be produced on NAD 27 when the existing corresponding line map was cast on NAD 27; or on NAD 83 when the corresponding line map was cast on NAD 83. However, orthophotoquads would be produced on either datum as requested by a cooperating agency.

Conversion of Digital Line Graph (DLG) products to NAD 83 was addressed in STI 89-1-D, issued December 26, 1989. STI 89-1-D stated that all DLG-E data (initial collection or converted from DLG-3) would be on NAD 83, DLG-3 data would be on the datum of the source graphic, and a routine (DLGSHIFT) would be developed to enable DLG-3 NAD 27 data to be referenced to NAD 83.

STI 92-1-C, 89-2-C and STI 89-1-D were issued when the NMD graphic product revision program was based on traditional cartographic methods and digital product revision relied heavily on graphic product as source. Since these STIs were issued, four activities have significantly enhanced NMD's capability to produce digital and graphic products on NAD 83. These activities include: 1 - rescoping of the modernization program to rely more on commercial-off-the-shelf hardware and software, 2 - initiation of

a digital revision program using digital orthophoto imagery for feature extraction, 3 - development of digital product generation methods, and4- coordination in planning of digital product and graphic product revision.

To date, over 30 States have been mandated by legislation to use NAD 83 as their official datum. Federal and State agencies have expressed concern about the potential delay in NMD implementation of NAD 83 on National Mapping Program products.

This STI replaces STI 89-2-C, STI 92-1-C, and STI 89-1-D and gives additional specific instructions for transition to NAD 83. In addition, this STI replaces Assistant Division Chief, Office of Research (ADC RES) memorandum "Clarification of Supplemental TI 89-2-C regarding primary series maps on NAD 27" dated November 1, 1990. It also replaces any conflicting information contained in ADC RES memorandum "Primary Series Maps on North American Datum of 1983 (NAD 83)" dated December 13, 1990.

INSTRUCTIONS

Maps on NAD 83 Cast the following maps on NAD 83:

- All maps produced from digital line graph data cast on NAD 83.
- All replacement mapping projects using traditional cartographic techniques.
- Traditional standard update mapping projects that consist of 12 or more contiguous quadrangles and that involve a significant cartographic effort, such as rescribing to current symbology or stereocompilation.
- County maps in States initiating a new program and in States with ongoing programs when agreed to by the States.
- All new National Park, State, and special maps.
- All graphic orthophoto quadrangles.

Show dashed corner ticks for NAD 27 on maps at 1:63,360 scale and larger. Do not show corner ticks for NAD 27 on maps smaller than 1:63,360 scale.

For maps at 1:63,360 scale and larger, show notes as defined in the following examples:*

> North American Datum of 1983 (NAD 83). Projection and 1 000-meter ticks: Universal Transverse Mercator, zone 13.
> 2 500-meter ticks: Colorado Coordinate System of 1983 (south zone)
>
> North American Datum of 1927 (NAD 27) is shown by dashed corner ticks. The values of the shift between NAD 83 and NAD 27 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software.

For maps at smaller than 1:63,360 scale to 1:1,000,000 scale, show notes as defined in the following examples:*

> North American Datum of 1983 (NAD 83). Projection and 10 000-meter grid: Universal Transverse Mercator, zone 13.
> 25 000-meter ticks: Colorado Coordinate System of 1983 (south zone)
>
> The values of the shift between NAD 83 and the North American Datum of 1927 (NAD 27) for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software.

* **Note**: the Alaskan islands of St. Lawrence, St. Matthew, St. Paul, or St. George each have their own datum and they should be referenced in lieu of NAD 27. For Hawaii, reference the Old Hawaiian Datum in place of NAD 27; for Puerto Rico, reference the 1940 Puerto Rico Datum. NADCON supports conversion from these island datums to NAD 83.

Maps on NAD 27. Retain all existing maps on NAD 27 during standard and limited update by traditional methods, and during reprint, except as instructed above.

Show dashed corner ticks for NAD 83 on maps at 1:63,360 scale and larger. Do not show corner ticks for NAD 83 on maps smaller than 1:63,360 scale.

During replacement mapping, standard and limited update, minor revision reprint, and standard reprint - show corners based on actual shift values if ticks do not exist or if existing ticks are not within .02 inches.

As-is reprint - do not make any changes to corner ticks and do not add new ticks at time of as-is reprint.

For maps at 1:63,360 scale and larger, retain any existing note at time of as-is reprint; do not add a new note. Otherwise, replace the existing datum note with, or add the note as shown in the following example:**

North American Datum of 1927 (NAD 27). Projection and 10 000-foot ticks: Oklahoma coordinate system, south (Lambert conformal conic). 1,000-meter Universal Transverse Mercator ticks, zone 14

North American Datum of 1983 (NAD 83) is shown by dashed corner ticks. The values of the shift between NAD 27 and NAD 83 for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software.

For maps at smaller than 1:63,360 scale, delete any existing note referencing predicted shift values at time of standard reprint, and add the following note. Also use the following note on all replacement maps, and at time of standard and limited update.** Retain the existing note(s) at time of as-is reprint; do not add a new note.

North American Datum of 1927 (NAD 27). Projection and
10 000-meter grid: Universal Transverse Mercator, zone 17.
100 000-foot ticks: North Carolina coordinate system

The values of the shift between NAD 27 and North American Datum of 1983 (NAD 83) for 7.5-minute intersections are obtainable from National Geodetic Survey NADCON software.

** **Note**: the Alaskan islands of St. Lawrence, St. Matthew, St. Paul, or St. George each have their own datum and they should be referenced in lieu of NAD 27. For Hawaii, reference the Old Hawaiian Datum in place of NAD 27; for Puerto Rico, reference the 1940 Puerto Rico Datum. NADCON supports conversion from these island datums to NAD 83.

Digital Data on NAD 83. Cast the following digital data on NAD 83

- All DLG-3's collected from cartographic source material on NAD 83.
- All DLG-E's mass-converted from DLG-3's on NAD 83.
- All digitally revised (all categories) DLG-3's and DLG-E's.
- All digital orthophoto quadrangles.
- All digital elevation models produced directly (not resampled from NAD 27) from NAD 83 source materials in support of the digital orthophoto program.
- All digital elevation models derived from cartographic source materials (i.e., map control, map separates) on NAD 83.

Digital Data on NAD 27. Cast the following digital data on NAD 27***

- All DLG-3's collected from cartographic source materials on NAD 27.
- All DLG-E's mass-converted from DLG-3's on NAD 27.
- All Level-2 digital elevation models derived from cartographic source materials on NAD 27.

*** **Note**: the Alaskan islands of St. Lawrence, St. Matthew, St. Paul, or St. George and each have their own datum. That datum should be referenced in lieu of NAD 27. For Hawaii, reference the Old Hawaiian Datum in place of NAD 27; for Puerto Rico, reference the 1940 Puerto Rico Datum; for Guam, reference the Guam Datum of 1963.

The Office of Research, with the Office of Production Operations and Modernization Program Office, will conduct and coordinate investigations and develop a strategy and implementation plan for the conversion of existing NAD 27 digital elevation model data to NAD 83.

Computed shift values between NAD 27 and NAD 83 for 7.5-minute map corners shall be derived from the National Geodetic Survey NADCON software which is available from the Office of Production Operations.

APPLIES TO

All National Mapping Program standard series maps; digital line graphs, digital orthophoto quadrangles, and digital elevation models.

ISSUED TO

EDC, MAC, MCMC, RMMC, and WMC.

APPROVED BY

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cc:

NMD	ADC/IS	USFS
ADC/PO	MPO	TVA
ADC/RES	PO (2)	CANADA
ADC/PB&A	PTS	Census
ADC/C&R		